Proactive Electronics / Avionics Integrity : Design, Manufacture, Application, and Environment

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Abstract

The integrity of electronics /avionics components, subsystems, and systems is dependent on four primary factors: design, manufacture, application, and environment, All of these factors are to some degree controllable, but, some are much more readily and economically controlled than others. They all interact to determine the ultimate peformance and integrity of electronics /avionics systems.

A number of general guidelines for the reliability of electronic components / systems have been developed, such as US Mil Hdbk 217. However, many of these guidelines were developed to support acturial or historic predictions for large populations and parts selection, rather than fundamental products improvement programs. Creative research efforts are necessary in bridging the gap that exists between the broad, acturial concepts and models of relaibility and durability and the narrow, complex physical models. Research efforts in avionics integrity(if it is to be a continual improvement tool, rather than another "qualification tool") must link together the technical, risk, and economic issues involved in defining, designing, manufacturing and supporting avionics.

It appears that more focus relative to reliability and durability issues should be placed on the manufacturing or conversion processes(and capabilities) and the product characteristics they generate relative to the applications and environments the product is likely to encounter.

This paper is to address the issues above in reliability and durability regarding electronic /avionic devices /systems.